

REMARKS

Claims 1-3, 5, 6, 8-10 and 12-14 are pending in this application. By this Amendment, claims 1, 3, 5, 6, 8-10, 12 and 13 are amended, claim 14 is added, and claims 4, 7, and 11 are canceled without prejudice to or disclaimer of the subject matter recited therein. Further, the specification is amended to include this application's priority information and Fig. 1 is amended for clarity. Support for the amendments can be found, for example, on page 8, lines 29-31 and page 9, lines 11-14. No new matter is added.

I. Priority Information

The Office Action acknowledges Applicants' claim for priority and asserts that such information must be included in the specification pursuant to 37 C.F.R. §1.78 and MPEP §201.11. Both §1.78(a)(2)(iii) and §201.11(III)(D) clearly state that reference to a priority application must be included in an application data sheet or the specification must contain or be amended to contain such reference. In this application, the priority information was included in an application data sheet filed in the Patent Office on September 8, 2003. However, the specification is amended to include the priority information.

II. Objection to the Drawings

The Office Action objects to the drawings under 37 C.F.R. §1.83(a) because of certain features recited in claims 1, 4, 6, 7, 11 and 12. The objection with respect to the certain features recited in canceled claims 4, 7 and 11 is moot. The objection with respect "armature" recited in original claim 1 is rendered moot by the deletion of "armature" from claim 1. Fig. 1 is amended to show the different clearances recited in claims 6 and 12, responsive to the objection. Thus, it is respectfully requested that the objection be withdrawn.

III. §112, First Paragraph, Rejection of claims 7 and 12

The Office Action rejects claims 7 and 12 under 35 U.S.C. §112, first paragraph. The rejection of canceled claim 7 is moot. The rejection of claim 12 is respectfully traversed.

The Office Action asserts that both the plain bearing and the ball bearing appear to be in direct contact with the respective shafts. However, the bearings are not in direct contact with the respective shafts. As is well known by one skilled in the relevant art, when a shaft supported by a bearing is rotated, the shaft indirectly comes in contact with the bearing via, for example, lube oil to smoothly rotate the shaft according to the fluid lubrication. Thus, there must be a clearance between the shaft and the bearing to provide an area for the fluid lubrication, an oil film of the lube oil having a predetermined thickness between the shaft and the bearing. It is well known in the art that a clearance L_c between shaft and bearing can be defined, for example, by the equation: $L_c = (\text{inner diameter of bearing} - \text{outer diameter of shaft}) \div 2$. Thus, it is respectfully requested that the rejection with respect to claim 12 be withdrawn.

IV. §112, Second Paragraph, Rejection of claims 1, 5 and 9

The Office Action rejects claims 1, 5 and 9 under 35 U.S.C. §112, second paragraph. The rejection is rendered moot by the deletion of "armature" in original claims 1 and 9 and the deletion of "closely" in original claim 5.

V. §102(b) Rejection of claims 1-8

The Office Action rejects claims 1-8 under 35 U.S.C. §102(b) over Isozumi, U.S. Patent No. 4,923,229. The rejection of canceled claims 4 and 7 is moot. The rejection of claims 1-3, 5, 6 and 8 is respectfully traversed.

Isozumi fails to disclose or suggest a clearance between the plain bearing and the output shaft is set to be larger than a clearance between the rolling-contact bearings and the pinion shaft, as recited in claim 1.

Isozumi teaches a coaxial type starter device 20 with a clutch device 22 (Fig. 1). The clutch device 22 has a clutch inner member 22a (Fig. 1). The member 22a includes a cylindrical portion 25. The cylindrical portion 25 is supported by first and second bearings 26 and 27 which are spaced apart in the axial direction of the portion 25. Therefore, the clutch inner member 22a can be rotated around its axial center (col. 4, lines 54-61). A first clearance exists between the set of bearings 26 and 27 and the cylindrical portion 25 (Fig. 1). The output rotary shaft 21 is supported by a bearing metal 28 which is fitted in the inner circumferential surface of the cylindrical portion 25 (col. 5, lines 17-21). A second clearance exists between the bearing metal 28 of the cylindrical portion 25 and the output rotary shaft 21 (Fig. 1). However, Isozumi fails to disclose or suggest the second clearance (between the bearing metal 28 and the output rotary shaft 21) is larger than the first clearance (between the set of bearings 26 and 27 and the cylindrical portion 25). Therefore, Isozumi fails to disclose or suggest a clearance between the plain bearing and the output shaft is set to be larger than a clearance between the rolling-contact bearings and the pinion shaft, as recited in claim 1.

Accordingly, when the output rotary shaft 21 disclosed by Isozumi inclines with respect to the bearings 26 and 27 by an amount equivalent to the first clearance, there is a high probability that twist is caused between the inclined shaft 21 and the cylindrical portion 25 spaced from each other by the second clearance. On the other hand, even if the pinion shaft of the claim 1 arrangement inclines with respect to the rolling-contact bearings by the maximum amount equivalent to the clearance CA (Fig. 1), no twist is caused between the inclined pinion shaft and the output shaft. As a result, driving loss is reduced and the output

reduction of the motor can be minimized (see page 10, lines 25-31 of the specification).

Thus, claim 1 is patentable over Isozumi.

Because claims 2, 3, 5, 6 and 8 incorporate the features of claim 1, these claims also are patentable over Isozumi. Thus, it is respectfully requested that the rejection be withdrawn.

VI. §103(a) Rejection of claims 9-13

The Office Action rejects claims 9-13 under 35 U.S.C. §103(a) over Isozumi in view of Miyazaki et al. (Miyazaki), U.S. Patent No. 5,996,230. The rejection of canceled claim 11 is moot. The rejection of claims 9, 10, 12 and 13 is respectfully traversed.

Isozumi fails to disclose or suggest a coupling clearance between the external helical spline and the internal helical spline is set to be larger than a clearance between the rolling-contact bearings and the pinion shaft, as recited in claim 9.

Isozumi teaches a helical spline formed in the inner circumferential surface of the clutch inner member 22a so as to extend to the intermediate portion of the cylindrical portion 25, between the two bearings 26, 27 (col. 5, lines 7-10). Helical spline teeth 21a are formed in the outer circumferential surface of the rear end of the output rotary shaft 21 along its axial direction so that the helical spline teeth 21a are interlocked with the helical spline formed in the inner circumferential surface of the clutch inner member 22a including the cylindrical portion 25 (col. 5, lines 10-17). A third clearance exists between the helical spline teeth 21a of the output rotary shaft 21 and the helical spline of the clutch device 22 (Fig. 1). However, Isozumi fails to disclose or suggest that the third clearance (between the helical spline teeth 21a and the helical spline of the clutch device 22) is larger than the first clearance (between the set of bearings 26 and 27 and the cylindrical portion 25). Therefore, Isozumi fails to disclose or suggest a coupling clearance between the external helical spline and the internal helical spline is set to be larger than a clearance between the rolling-contact bearings and the

pinion shaft, as recited in claim 9.

When the third clearance between the helical spline teeth 21a of the output rotary shaft 21 and the helical spline of the clutch device 22 is set so as to be lower than the first clearance, it is necessary to increase the machining accuracy of the splines, thus increasing machining costs. On the other hand, the combination of features recited in claim 9 lowers the required machining accuracy of the splines and suppresses the associated machining costs (see page 12, lines 1-3 of the specification).

Miyazaki teaches a double-row ball bearing having a stationary shaft (Abstract). However, Miyazaki fails to overcome the deficiencies of Isozumi with respect to claim 9. Thus, claim 9 is patentable over the combination of Isozumi and Miyazaki.

Because claims 10, 12 and 13 incorporate the features of claim 9, these claims also are patentable over the combination of Isozumi and Miyazaki. Thus, it is respectfully requested that the rejection be withdrawn.

VII. Claim 14

New claim 14 also is patenable over the combination of Isozumi and Miyazaki.

VIII. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-3, 5, 6, 8-10 and 12-14 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:DRK/axl

Attachment:
Replacement Sheet (1)

Date: October 3, 2006

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>

Amendments to the Drawings:

The attached replacement drawing sheet makes changes to Fig. 1 and replaces the original sheet with Fig. 1.

Attachment: Replacement Sheet (1)